

Simultaneous Equations by elimination

⑤ Examples discussed & annotated on sheet

Solve

$$\textcircled{1} \quad 2x + 3y = 8$$

$$\textcircled{2} \quad 3x - y = 23$$

$$\textcircled{3} = \textcircled{2} \times 3$$

$$9x - 3y = 69$$

$$\textcircled{1} + \textcircled{3}$$

$$11x = 77$$

$$\underline{\underline{x = 7}}$$

substitute $x = 7$ into $\textcircled{1}$

$$2(7) + 3y = 8$$

$$14 + 3y = 8$$

\Rightarrow

$$\underline{\underline{y = -2}}$$

④ get the same number
in front of either both x 's
or both y 's.

Solve

$$\textcircled{1} \quad 2x + 3y = 8$$

$$\textcircled{2} \quad 3x - y = 23$$

$$\textcircled{3} = \textcircled{1} \times 3 \quad 6x + 9y = 24$$

$$\textcircled{4} = \textcircled{2} \times 2 \quad 6x - 2y = 46$$

$$\textcircled{3} - \textcircled{4}$$

$$11y = -22$$

$$9 - 2 = 9 + 2 = 11$$

$$24 - 46$$

$$y = -2$$

Substitute $y = -2$ into

$$\textcircled{1} \quad 2x + 3(-2) = 8 \Rightarrow 2x = 14 \Rightarrow x = 7$$

$$\textcircled{2} \quad 3x - (-2) = 23 \Rightarrow 3x + 2 = 23 \Rightarrow 3x = 21 \Rightarrow x = 7$$

⚠️ notice that
6 is the LCM
of 2, 3.

Example 1b

$$\textcircled{1} \quad 4x - 5y = 4$$

$$\textcircled{2} \quad 6x + 2y = 25$$

eliminate:

$$\textcircled{3} = \textcircled{1} \times 3: \quad 12x - 15y = 12$$

$$\textcircled{4} = \textcircled{2} \times 2: \quad 12x + 4y = 50$$

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$$\textcircled{3} = \textcircled{1} \times 2: \quad 8x - 10y = 8$$

$$\textcircled{4} = \textcircled{2} \times 5: \quad 30x + 10y = 125$$

to get x to match

$$4, 8, \quad 16, 20, \dots$$

$$6, \quad 18, \dots$$

to get y to match

$$5, \quad 15, 20, \dots$$

$$2, 4, 6, 8, \quad 12, \dots$$

Exercise 3A

1

$$\textcircled{1} \quad 2x - y = 6$$

$$\textcircled{2} \quad 4x + 3y = 22$$

$$\textcircled{3} = \textcircled{1} \times 3 \quad 6x - 3y = 18$$

$$\textcircled{2} + \textcircled{3} : \quad 10x = 40$$

